

Habitat Fragmentation

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What is Habitat Fragmentation?

Natural

- ||||| Rivers
- ||||| Volcanoes
- ||||| Glacial Movement



Anthropogenic (Human-Made)

- ||||| Roads
- ||||| Forest Removal



Metapopulation

||||| **Metapopulation:** a group of populations separated by space but consisting of the same species

||||| Cons: Food; Space; Mates; High Predation

||||| Pros: a chance for more “fitted” species to arise

||||| **Subpopulation:** individuals of the same species that are grouped together

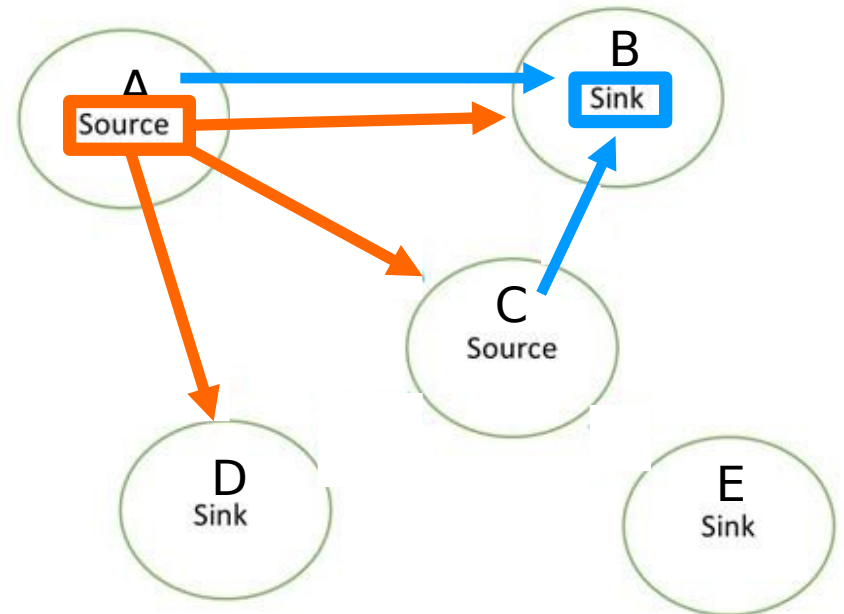
Source & Sink

Source:

- Emigration will occur but no Immigration
- No NEW individuals
- Birds spreading out from one individual tree collection & thriving

Sink:

- Immigration will occur but no Emigration
- Always NEW individuals
- A lizard going into a desert, not being able to thrive there



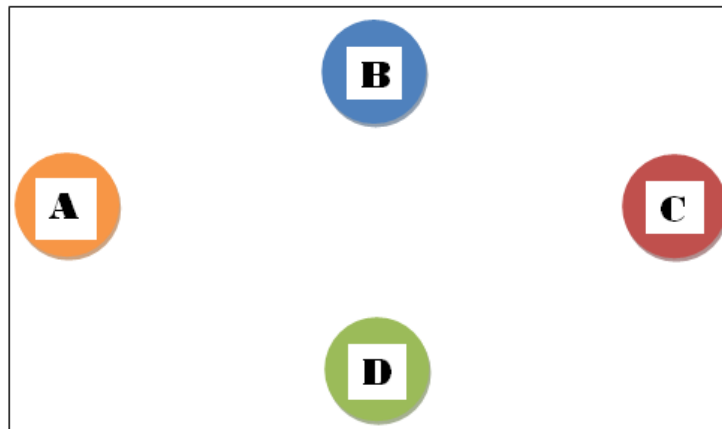
GAME TIME

||||| *A forest has been recently disrupted by plans to build a new housing development. The roads and houses have now fragmented the habitat.*

||||| Working in pairs, Play the Metapopulation Game

||||| Observe any Changes by using arrows, moving beads, and removing beads

||||| Beads represent fur color in each environment



RULES

- Starting with Subpopulation “A”
 - Roll Dice
 - Pick up an Action Card
 - Complete Action
 - Place Arrow on Board to show movement
- In the case where one circle contains two or more different colors and emigrates, equal amounts should be taken
- Stop when no more Action Cards Remain
- Identify Source & Sink Populations

Metapopulation Review

- Are there equal amounts of each bead after playing the game?
- Why might it be a problem for individuals to die off in a specific subpopulation?
- Can you identify a Source & a Sink subpopulation?
- What do you think is the best solution?

How Can We Help ?

▮▮▮▮ **Viability Analysis:** determines the probability that a population will become extinct within a given number of years

▮▮▮▮ **Example: Fender's Blue Butterfly & Island Fox**

▮▮▮▮ **Corridors, or habitat pathways, may help individuals safely move between subpopulations**

▮▮▮▮ **Pros:**

▮▮▮▮ There is habitat between subpopulations

▮▮▮▮ **Cons:**

▮▮▮▮ May not be big enough

▮▮▮▮ Larger risk for predation

▮▮▮▮ Confined area

Replay the Metapopulation Game

1. Identify two subpopulations to connect a corridor
 1. Example: “A” & “B”
2. At the beginning of each turn of that population pick up all the beads in both subpopulations and shake in hand
 1. At the beginning of “A”'s turn
 2. At the beginning of “B”'s turn
3. Separate beads equally back into the subpopulations without looking
 1. Both populations will have a mixture of the two populations

Step 1

- Collate data
- Identify problem
- List options

Components of population viability analysis.

From Akçakaya et al. (1999); copyright by Applied Biomathematics.

Step 2

Determine (or modify)
model structure

Step 3

Estimate (or refine)
parameters

Step 4

Build (or improve)
model

Step 10

Evaluate the data from
monitoring

Step 6

Perform sensitivity
analysis

Step 5

Assess extinction
risks and recovery
chances

Step 9

Monitor the species
(long-term)

Step 8

Implement the
management plan

Step 7

Rank options select
the optimal
management plan



Career Connection

Conservationist

Fighting for the Protection & Conservation of the Environment

Ecologist

Studying & Learning about Species Interacting with Each Other & Other Organisms

Geneticist

Testing for Genetic Variation & Viability Analysis (probability that a population will go extinct within a given number of years)